ENOUGH IS ENOUGH: COGNITIVE ANTECEDENTS OF WORKAHOLISM AND ITS AFTERMATH

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Workaholism is commonly conceptualized as a compulsive inner drive to work excessively hard. This study investigates to what extent rigid personal beliefs—i.e., performance-based self-esteem *(self-esteem that is contingent upon good performance) and an* enough continuation rule *(continuing with work until one feels one has done enough)—contribute to exhaustion through workaholism. To examine these potential antecedents and consequences of workaholism, data of a two-wave longitudinal survey study with a six-month time interval was used (*n = *191). Results of structural equation modeling provided support for our hypotheses. Taken together, our findings show that rigid personal beliefs at T1 predicted primarily working compulsively at T2, and working compulsively at T1 influenced exhaustion at T2. Moreover, reciprocal relationships were found between applying the enough continuation rule and working compulsively, and between working compulsively and exhaustion. These results suggest partial mediation from cognitive antecedents (personal beliefs) through workaholism to exhaustion. In practical terms, the results indicate that cognitive antecedents may provide a good starting point for interventions for preventing exhaustion and workaholism.*

Keywords: workaholism, exhaustion, performance-based self-esteem, enough continuation rule, cognitive factors, longitudinal

Introduction

Most people spend a considerable part of their lives working, but some individuals devote more time to work than others. While there are several reasons to work hard, for some it seems a manifestation of their compulsive inner drive to work excessively hard. This phenomenon was referred to as "workaholism" by Wayne Oates (1968). As workaholics compulsively invest much effort into their work (Scott, Moore, & Miceli, 1997), they are at risk of developing health problems (Burke, 1999c; Taris, Geurts, Schaufeli, Blonk, & Lagerveld, 2008). Finding ways to effectively

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reduce or prevent workaholism is important for HR professionals and relies on a better understanding of its antecedents. Previous studies have shown that demographic characteristics (Spence & Robbins, 1992), a stressful work environment (Kanai & Wakabayashi, 2004), and an organizational culture that values high work pressure (Buelens & Poelmans, 2004) relate to workaholism. A rather unexplored but important issue is how specific cognitive factors exert influence on workaholism (McMillan, O'Driscoll, & Burke, 2003), and thus, on health problems, such as burnout.

There is reason to believe that cognitions play an important role in the development of workaholism. For instance, in a cross-sectional study, Burke (1999b, 2001) showed that striving against others, moral principles, and proving oneself were predictive of a workaholic drive. Furthermore, it has been suggested by Porter (2004) that workaholics "are prone to rigid thinking; they are not able to be flexible in their ideas. This results in perfectionist attitudes that exceed simple maintenance of high standards" (p. 435). More knowledge on the cognitive vulnerabilities of workaholics may yield new insights into the development of workaholism. A related advantage of a cognitive approach is that it adopts an optimistic point of view with regard to changing the workaholic behavior; that is, if maladaptive thought patterns lead to workaholic behavior, workaholism may be decreased through adjustment of dysfunctional cognitions (McMillan & O'Driscoll, 2008). This implies that the cognitive approach may provide HR professionals with practical tools for recognizing and treating potentially maladaptive hard workers, which, in turn, could have a positive effect on the reduction of burnout. As suggested by Robinson (2007), as workaholics "try to squeeze more work into less time, burnout occurs for them" (p. 46). The notion that workaholics have a relatively high risk of burnout is confirmed by a number of cross-sectional studies (cf. Andreassen, Ursin, & Eriksen, 2007; Taris, Schaufeli, & Verhoeven, 2005; Taris et al., 2008). However, so far, the causal nature of this relationship remains untested. Furthermore, there is reason to believe that workaholism mediates the relationship between cognitive antecedents and burnout. For instance, Taris, Van Beek, and Schaufeli (2010) showed that the association between perfectionism and burnout (emotional exhaustion) was mediated by workaholism. However, this assumption has as yet not been tested in a longitudinal design using multiple cognitive antecedents.

In the present study, we aim to show that cognitive antecedents have an indirect impact on exhaustion through workaholism.

In the present study, we aim to show that cognitive antecedents have an indirect impact on exhaustion through workaholism. Building upon the Conservation of Resources theory (Hobfoll, 1989, 2002), we examine reciprocal relationships between cognitive antecedents, workaholism, and exhaustion. The focus is on two specific cognitive antecedents—namely, (1) *performance-based self-esteem* (i.e., a self-esteem that is highly contingent on one's perceived performance) and (2) applying an *enough continuation rule* (i.e., drawing on one's perceived performance for determining work persistence).

Workaholism

Ever since the notion of "workaholism" was introduced, scholars have held different viewpoints on its definition. The common theme in most definitions is that workaholics spend considerable time on their work. However, the reasons for people to work hard may differ, and do not inevitably indicate workaholism (Porter, 1996). An influential definition that was not based on work hours alone, and that referred to the motivation to do so, was provided by Spence and Robbins (1992). They suggested that a "real" work addict is "highly work involved, feels compelled or driven to work because of inner pressures, and is low in enjoyment of work" (p. 162). In an analysis on the common elements in definitions of workaholism, Scott et al. (1997) distinguish the following three critical characteristics of workaholics: (1) they tend to spend a large amount of time on work activities, (2) they frequently think about work when not at

work, suggesting they are obsessed with work, and (3) they tend to work beyond organizational and monetary expectations, needs, or demands. Schaufeli, Taris, and Bakker (2008) noted that the final feature seems an extension of the first, because it refers to the reason for spending a great deal of time on work. In a more recent review, Ng, Sorensen, and Feldman (2007) defined workaholism as reflecting affect, cognition, and behavior. They typified workaholics as those who are obsessed with working, commit long hours to work, and enjoy working. It should be noted that, according to Ng and his colleagues, workaholics enjoy the *act of working* rather than the *actual work* they do. However, some have argued that enjoyment by nature, whether high or low, whether focused on work or on the act of working, cannot be a central component of workaholism, because by discriminating both "good" and "bad" forms of workaholism, the meaning of the term is blurred (Mudrack, 2006; Porter, 2001). Therefore, we agree with Scott et al.'s notion that workaholism is a combination of a cognitive (work obsession) and a behavioral (excess work) component. This is in line with the definition as proposed by Oates (1971), who labeled workaholism as "the compulsion or the uncontrollable need to work incessantly" (p. 11). In accordance with his definition, we posit that workaholics have "an irresistible inner drive to work excessively hard" (Schaufeli et al., 2008, p. 219).

Theoretical Framework

The Conservation of Resources (COR) theory (Hobfoll, 1989, 2002) provides a useful framework for understanding the adverse consequences of workaholic behavior. COR theory states that people attempt to attain, maintain, and protect their resources. These resources are entities that people personally value or that serve as a means to attain favorable outcomes, including objects, conditions, personal characteristics, and energy resources. From a COR perspective, individuals experience stress: (1) when resources are threatened, (2) when resources are lost, and/or (3) when individuals fail to gain resources after investments have been made to maximize resources. COR theory has been applied for understanding—for instance, the burnout process (Halbesleben, 2006; Hobfoll & Freedy, 1993). Burnout is a chronic stress reaction that typically results from a process of gradual depletion of resources without compensating resource gain or replenishment of resources. Burnout is an important issue for organizations, because of its negative impact on job performance, organizational commitment, turnover, and job satisfaction (Halbesleben & Buckley, 2004; Shirom, 2003). Although burnout is usually defined by exhaustion, cynicism, and reduced efficacy (Schaufeli, Leiter, Maslach, & Jackson, 1996), exhaustion is considered to be its core symptom (Schaufeli & Enzmann, 1998), which is characterized by a depletion of mental resources.

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There are strong indications that workaholism has serious implications for employee health, particularly in terms of the level of burnout (Andreassen et al., 2007; Burke, 1999c; Taris et al., 2005, 2008). Because workaholics work hard, they seem to deplete their resources to the point of near exhaustion (Maslach, 1986). This is consistent with studies that show that working long hours is related to increased levels of strain (for a review, see Van der Hulst, 2003). A lack of recovery might explain why workaholism translates into burnout—that is, hardworking employees may not have enough time left to recover from their work efforts by relaxing or sleeping (Sonnentag & Zijlstra, 2006; Van Wijhe, Peeters, Schaufeli, & Ouweneel, 2013), which could result in fatigue and, eventually, exhaustion. Nonetheless, the causal direction of the relationship between workaholism and exhaustion has not been established in earlier research. Longitudinal research can shed more light on the direction of the relationship between workaholism and burnout. We anticipate that, over time, a compulsive drive to work and devoting a great deal of time

to work will have negative consequences in terms of increased exhaustion.

Cognitive Antecedents of Workaholism

What causes workaholism? The cognitive approach views workaholism as stemming from dysfunctional core beliefs (e.g., "I am a failure"), faulty assumptions (e.g., "I am only lovable if I succeed"), and automatic thoughts (e.g., "I have to work hard") (McMillan & O'Driscoll, 2008). Porter (2004) suggested that "the workaholic's life is an endless pursuit of more and more accomplishment, in an attempt to finally feel of genuine worth, but to no avail" (p. 435). Hallsten (1993) labeled such a contingent self-worth as "performance-based self-esteem." Performance-based self-esteem is an orientation to gain or maintain self-esteem through good role performances. Hallsten, Voss, Stark, Vingård, and Josephson (2011) showed that having performance-based self-esteem is a risk factor for developing burnout. The rationale is that when individuals' self-esteem is contingent upon outstanding performances, they are likely to work very hard to achieve recognition, which may ultimately drain their energy and lead to burnout. Since workaholics work excessively by definition, it is plausible that having performance-based self-esteem constitutes a risk factor for developing workaholism. Individuals, who constantly have to sustain their self-esteem, might view work as an opportunity to prove themselves. In other words, workaholism expresses the need or desire for self-esteem, which may eventually lead to burnout. Hallsten, Josephson, and Torgén (2005) showed, indeed, that performance-based self-esteem relates to working overtime, as well as to a Type-A behavior pattern (Burke, 1999a; Robinson, 1999) and perfectionism (Spence & Robbins, 1992), which are akin or related to workaholism. In addition, in line with our reasoning that workaholism is determined by performance-based self-esteem, workaholism has been associated with achievement-related values and traits (Ng et al., 2007). According to Ryan and Deci (2000), contingent self-esteem is anchored in introjected regulation, which is a form of extrinsic motivation whereby one performs actions in order to avoid guilt or anxiety, or to attain ego enhancement. In a recent study, Van Beek, Hu, Schaufeli, Taris, and Schreurs (2011) show that such a motivational orientation is associated with workaholism. In other words, in order to avoid feeling like a failure, workaholics have internalized external performance demands. In the present study, we test the assumption that when employees base their sense of self-worth on their performance, they are susceptible for developing workaholism.

Moreover, earlier work has suggested that compulsive behaviors such as workaholism arise when individuals commit to self-imposed and rigid cognitive rules (Bénabou & Tirole, 2004). The Mood-as-Input (MAI) model (Martin, Ward, Achee, & Wyer, 1993), which has proven to be relevant in clinical psychological settings for explaining compulsive behaviors, provides a theoretical basis for this assumption. The MAI model assumes that people use personal cognitive "rules" to evaluate how they are doing on a given task with no clear ending. According to the MAI model, individuals can use their work output or their work enjoyment (*an enough rule* and *an enjoyment rule,* respectively) as a benchmark for this evaluation.

Workaholics typically set high performance standards for themselves (Spence & Robbins, 1992). Since workaholics take pride in the amount of work they have done (Oates, 1971), doing enough work seems important to them. As workaholics tend to overestimate the consequences of failure (Berglas, 2004), this overstriving may be considered as a form of avoidance behavior; it prevents the occurrence of anticipated negative consequences (e.g., rejection by colleagues). Workaholism has been associated with job dissatisfaction, which possibly reflects that workaholics are convinced that they are unable to fulfill their work aspirations (Scott et al., 1997). Work provides workaholics with temporary satisfaction but repeatedly fails to offer a long-lasting sense of achievement. With every disappointment, workaholics set higher goals, hoping that they perform better in the future so that

they can feel good about themselves (Porter, 1996). Since workaholics, by definition, work far beyond their job descriptions (Scott et al., 1997), it is obviously difficult for them to set boundaries because they never feel that they put enough effort into their work. Van Wijhe, Peeters, and Schaufeli (2011) were the first who applied the principles of the MAI model to the work context. In a study among academics, they found that there is a distinction between rules used to stop and to continue working. Workaholics were found to continue working when they felt they hadn't done enough yet (an enough continuation rule). Remarkably, no relationship was found between the enough stop rule (quit working when one feels one has done enough) and workaholism. The fact that workaholics do not stop working when they have done enough, but then again continue working when they have not done enough, seems to mirror their compulsive tendencies. Based on these indications, we expect that applying the principle of continuing working in order to do as much as possible might be a precursor of workaholism. In the present study, we test the assumption that when employees tend to persist with working based on an evaluation of their output, they are vulnerable for developing workaholism.

Taken together, our theorizing as well as the results of previous studies leads us to formulate the following hypotheses:

Hypothesis 1: Having performance-based self-esteem will have lagged positive effects on (a) working compulsively and (b) working excessively.

Hypothesis 2: The enough continuation rule will have lagged positive effects on (a) working compulsively and (b) working excessively.

Hypothesis 3: (a) Working compulsively and (b) working excessively will have lagged positive effects on exhaustion.

The present study aims to focus on the mechanism linking cognitive antecedents to burnout, through workaholism. As outlined previously, earlier research demonstrated positive relationships between performance-based self-esteem and burnout (Hallsten et al., 2011). There are also indications for a positive relationship between perfectionism (concern over making mistakes) and burnout (Taris et al., 2010). A strong performance orientation might have negative consequences, in that it impedes individuals from paying attention to their own needs, and therefore increases the risk of burnout. In addition, cognitions such as performance-based self-esteem and the enough continuation rule may be associated with a higher burnout risk, because such beliefs lead to workaholic patterns that deplete a person's mental energy. If we expect that workaholism mediates the association between cognitive antecedents and exhaustion, a direct relationship between cognitive antecedents and exhaustion is a precondition. For that reason, we formulated the following hypotheses:

Hypothesis 4: Performance-based self-esteem will have a lagged positive effect on exhaustion.

Hypothesis 5: The enough continuation rule will have a lagged positive effect on exhaustion.

To test the hypothesized relationships, we employed a two-wave design with a six-month time lag between the study waves. Following suggestions of De Lange, Taris, Kompier, Houtman, and Bongers (2003), we systematically compare structural models to investigate plausible causal relationships between cognitive antecedents, workaholism, and burnout. Specifically, we compared three different types of causality: (1) normal causation (as stated in our hypotheses), (2) reverse causation (e.g., workaholism may lead to higher levels of performance-based self-esteem), and (3) reciprocal causation (e.g., the enough continuation rule and workaholism affect each other mutually).

Method

Participants and Procedure

Participants were invited as part of a two-wave longitudinal well-being survey among staff members of a Dutch University. At Time 1,

732 employees were approached for participation in the study. In total, 340 employees responded (response rate of 46.5 percent) by completing an online questionnaire that included questions about work characteristics, motivation, and well-being. The anonymity and confidentiality of the data were ensured. Furthermore, participants voluntarily agreed to take part in the study and were informed that completing the questionnaire represented their informed consent. At Time 2, six months later, the initial group of employees was requested to complete a highly similar survey. Of these respondents, 305 agreed to participate (response rate of 41.7 percent). Altogether, 191 employees completed both the first and the second questionnaire (response rate of 26.1 percent). No differences with regard to age and sex were found on Time 1 between those who agreed to participate in the follow-up study ($n = 191$) and the nonresponse group ($n = 149$).

The final sample consisted of 66 males (34.6 percent) and 125 females (65.4 percent), with an average age at Time 1 of 39.10 years (SD = 12.09). In addition, the majority of the sample held a college or a university degree (92.6 percent). Three-quarters (75.0 percent) of the sample was part of the scientific staff, while the remaining part consisted of support staff. Organizational tenure was 9.37 years (SD = 9.64), with an average of 5.07 years (SD = 2.37) in the present job. While participants had an average number of 32.76 contract hours (SD = 7.63) per week, they reported to actually work more hours (M= 39.45 hours, SD = 10.42) per week. A typical full-time contract at Dutch universities includes 36 working hours per week, but many employees work part-time.

Measures

Workaholism was measured with the short Dutch Work Addiction Scale (Schaufeli, Shimazu, & Taris, 2009), which consists of two dimensions. The first dimension, Working Compulsively (WC), includes five items (e.g., "I feel that there's something inside me that drives me to work hard"), and the second dimension, Working Excessively (WE), comprises five items as well (e.g., "I overly commit myself by biting off more than I can chew"). The WC scale is derived from the Drive scale of the Workaholism Battery (WorkBat; Spence & Robbins, 1992), whereas the WE scale is based on the Compulsive Tendencies scale of the Work Addiction Risk Test (WART; Robinson, 1999). Both scales use a four-point scale (1 = never, 4 = always). The internal consistencies of WC and WE were .72 and .68 at Time 1, and .73 and .70 at Time 2, respectively.

Performance-based self-esteem was measured by four items that were derived from the work of Hallsten (1993, 2005): (1) "I think that I sometimes try to prove my worth through my work," (2) "My self-esteem is far too dependent on my work achievements," (3) "At times, I have to be better than others to be good enough myself," and (4) "Occasionally I feel obsessed to accomplish something of value through my work" (1 = strongly disagree, 5 = strongly agree). The internal consistencies of the scale were .67 at Time 1 and .73 at Time 2.

The *enough continuation rule* was assessed using the three-item scale of the Work Persistence Rules Checklist (Van Wijhe et al., 2011). People were asked how often they continued working the last five working days because of the following reasons: (1) "I wanted to be sure that I had done enough," (2) "I had not been productive enough," and (3) "I felt that I did too little work" (1 = (almost) never, 5 = (almost) always). The internal consistencies of the scale were .81 at Time 1 and .79 at Time 2.

Exhaustion was measured using the Dutch version (Schaufeli & Van Dierendonck, 2000) of a subscale of the Maslach Burnout Inventory-General Survey (MBI-GS; Schaufeli et al., 1996). The exhaustion scale comprises five items that refer to severe tiredness. An example item is: "I feel mentally exhausted because of my work" (0 = never, 6 = always). The internal consistencies of the scale were .82 at T1 and .87 at Time 2.

Data Analysis

We applied structural equation modeling (SEM) using AMOS (Arbuckle, 2007) to examine the

hypothesized longitudinal relationships among the cognitive antecedents, workaholism, and burnout. Because of our relatively small sample size, we decreased the complexity of our hypothesized model by using manifest variables only (Jöreskog & Sörbom, 1993). According to Cole and Maxwell (2003) and Taris and Kompier (2006), a two-wave mediation test is conducted in two steps: (1) testing the relationships between the predictor at T1 (i.e., cognitive antecedents) and the mediator at T2 (i.e., working compulsively and working excessively) controlling for the mediator at T1 and (2) testing the relationships between the mediator at T1 and the outcome at T2 (i.e., exhaustion) controlling for the outcome at T1. Under the assumption that the relationships do not change in magnitude over time, the paths between the mediator at T1 and outcome at T2 would be equivalent to the path between the mediator at T2 and a hypothetical outcome variable at T3. Under this assumption, the product of the path between the predictor at T1 and the mediator at T2 by the path between the mediator at T1 and the outcome at T2 gives an estimate of the mediational relationship (Cole & Maxwell, 2003). Full mediation cannot be examined in a two-wave design, as it is not possible to test whether the relationship between the predictor and outcome can be fully explained by the mediator.

Following these steps, we (1) estimated the causal relationships between the predictors (performance-based self-esteem and enough continuation rule) and the mediators (working compulsively and working excessively) and (2) the causal relationships between the mediators (working compulsively and working excessively) and the outcome (exhaustion). In line with Hakanen, Peeters, and Perhoniemi (2011), we additionally tested the direct associations between the predictors (i.e., cognitive antecedents) and the outcome (i.e., exhaustion). Our full-panel design enabled us to compare several alternative models, including causal and reversed causal effects. First, we specified a model including autoregressive effects (i.e., stability paths between each possible pair of variables of both measurement waves) and synchronous effects (i.e., residual co-variances) of variables, without any cross-lagged associations. This model is dubbed the stability model (Model 1). Second, we tested a model that is similar to Model 1 but that also includes the hypothesized cross-lagged structural paths. This model is labeled as the normal causation model (Model 2). Third, we examined a model that is identical to Model 1 but that also incorporates cross-lagged structural paths that are opposite to the structural paths of Model 2. This is called the reversed causation model (Model 3). Finally, we specified a model that includes reciprocal relationships between the study variables and integrates all effects of Models 1, 2, and 3. This model is called the reciprocal model (Model 4). Altogether, for each of the three sets of analyses, four structural equation models were compared. In our analyses, we controlled for age and gender.

As preliminary analyses of the distribution of data indicated no significant deviations from normality, the use of maximum likelihood estimations for analyzing covariance matrices is justified. The model fit was evaluated in terms of the chi-square (χ^2) statistic and the root mean square error of approximation (RMSEA). We also examined fit indices that are less sensitive to sample size, including the Comparative Fit Index (CFI) and the Tucker Lewis Index (TLI). For the RMSEA, values of .08 indicate acceptable model fit, while values of .05 are indicative of good model fit (Kline, 2005). For the other fit statistics, values of .90 represent acceptable fit, while values of .95 or higher indicate good fit (Hu & Bentler, 1999).

Results

Descriptive Statistics

Table I presents means, standard deviations, and correlations among the study variables. All correlations were in the expected direction. The high test–retest correlations (r's $\geq$ .66) show that perceptions of performance-based self-esteem, the enough continuation rule, workaholism, and exhaustion are relatively stable over time.

TABLE I Means, Standard Deviations, and Correlations Among the Study Variables ($n = 191$)

	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12
1. Age	39.10	12.09	–											
2. Gender (1 = female)	0.65	0.48	−.33***	–										
3. Performance-based self-esteem T1	3.48	0.63	−.32***	−.02	–									
4. Performance-based self-esteem T2	3.41	0.71	−.26***	.07	.68***	–								
5. Enough continuation rule T1	2.53	0.97	−.35***	.15*	.27***	.30***	–							
6. Enough continuation rule T2	2.49	0.95	−.27***	.11	.32***	.31***	.66***	–						
7. Working compulsively T1	1.93	0.56	−.25**	−.01	.43***	.36***	.45***	.40***	–					
8. Working compulsively T2	1.96	0.58	−.26***	−.01	.47***	.42***	.44***	.42***	.71**	–				
9. Working excessively T1	2.25	0.57	.01	−.06	.26***	.13	.29***	.26***	.52**	.41***	–			
10. Working excessively T2	2.28	0.59	.00	−.09	.20**	.13	.32***	.29***	.36**	.49***	.77***	–		
11. Exhaustion T1	1.44	0.87	−.14	−.07	.17*	.00	.28***	.20**	.31**	.34***	.32***	.33***	–	
12. Exhaustion T2	1.51	0.95	−.23**	−.01	.23**	.16*	.32***	.30***	.40**	.55***	.36***	.47***	.66***	–

T1 = Time 1, T2 = Time 2.
*$p < .05$, **$p < .01$, ***$p < .001$.

Cognitive Antecedents and Workaholism

We employed a three-step cross-lagged panel analysis to test the relationships from cognitive antecedents through workaholism to exhaustion. First, we examined the relationships between the hypothesized predictors (performance-based self-esteem and enough continuation rule) and mediators (working compulsively and working excessively). Table II summarizes the fit indices, as well as the model comparisons for the cross-lagged relationships between performance-based self-esteem and the enough continuation rule on the one hand and the two dimensions of workaholism on the other hand. All models indicate a good fit, as the greater part of the fit indices are well over the .95 threshold and the RMSEA is equal or lower than .08.

The chi-square difference test between the models indicated that the normal causation model provided a significant better fit to the data than the stability model (M2 vs. M1). In addition, the reversed causation model showed a slightly better fit to the data than the stability model (M3 vs. M1). It was also shown that the model that included reciprocal effects of cognitive antecedents and workaholism fitted the data significantly better than the stability model (M4 vs. M1). Moreover, the reciprocal causation model showed a significantly better fit to the data than the normal causation model (M4 vs. M2) and the reversed causation model (M4 vs. M3), also in terms of the additional fit indices. Altogether, compared to the other competing models, the reciprocal model accounted best for the data. However, not all the paths in Model 4 were statistically significant. After omitting the nonsignificant paths in a stepwise backward fashion, the fit of the final model (M5) remained satisfactory and was not different from the reciprocal causation model (M5 vs. M4). For that reason, we chose the most parsimonious model (M5) as our final model.

Standardized parameter estimates for the final model are presented in Figure 1. The stability coefficients for the constructs ranged from .64 to .76. This means that the variables have moderately high to high six-month stability. Concerning the relationships between the covariates and the variables at Time 1, age was negatively related to performance-based self-esteem ($\beta = -.36$, $p < .001$), the enough continuation rule ($\beta = -.34$, $p < .001$), and working compulsively ($\beta = -.28$, $p < .001$). This indicates that younger employees reported higher scores on these variables. Gender was not related to the other variables at Time 1.

According to Hypothesis 1, performance-based self-esteem would be positively related to working compulsively and to working excessively over time. The results showed that, indeed, T1 performance-based self-esteem ($\beta = .17$, $p < .001$) had a positive, lagged effect on T2 working compulsively, but not on T2 working excessively. Thus, Hypothesis 1 was partly supported.

Hypothesis 2 stated that the enough continuation rule would be positively related to working compulsively as well as to working excessively over time. The final model showed that the enough continuation rule at T1 had a unique positive effect on T2 working compulsively ($\beta = .11$, $p < .05$) and on T2 working excessively ($\beta = .10$, $p < .05$). Thus, Hypothesis 2 was fully supported. In addition, a reversed causal effect was found of T1 working compulsively on the T2 enough continuation rule ($\beta = .14$, $p < .05$). In other words, the enough continuation rule and working compulsively affect each other mutually.

Workaholism and Exhaustion

In the second step, we investigated the lagged relationships between the mediators (working compulsively and working excessively) and the expected outcome (exhaustion). Table II presents the fit indices and the comparison of the competing causal models. Overall, the models show a good fit to the data, since all fit indices meet accepted standards. The only exception is the RMSEA value ($> .08$) for the stability model (M1) and the reversed causation model (M3).

The comparison of the four models shows that the normal causation model had a significantly better fit than the stability model

TABLE II Model Fit Indices of the Study Models ($n = 191$)

Model		χ^2	*df*	*p*	RMSEA	TLI	CFI	Nested Model Comparison	$\Delta\chi^2$	Δdf
Cross-lagged relationships between cognitive antecedents and workaholism										
M1	Stability model	43.67	20	.000	.08	.93	.97			
M2	Normal causation model	24.58	16	ns	.05	.97	.99	M1 vs. M2	19.09***	4
M3	Reversed causation model	31.95	16	.01	.07	.94	.98	M1 vs. M3	11.72*	4
M4	Reciprocal causation model	13.78	12	ns	.03	.99	1.00	M1 vs. M4	29.89***	8
								M2 vs. M4	10.80*	4
								M3 vs. M4	18.17**	4
M5	Final model	19.61	16	ns	.03	.99	1.00	M1 vs. M5	24.06***	4
								M4 vs. M5	5.83	4
Cross-lagged relationships between workaholism and exhaustion										
M1	Stability model	36.96	12	.000	.11	.91	.96			
M2	Normal causation model	15.41	10	ns	.05	.98	.99	M1 vs. M2	21.55***	2
M3	Reversed causation model	28.01	10	.002	.10	.94	.97	M1 vs. M3	8.95*	2
M4	Reciprocal causation model	8.66	8	ns	.02	1.00	1.00	M1 vs. M4	28.30***	4
								M2 vs. M4	6.75*	2
								M3 vs. M4	19.35***	2
M5	Final model	10.37	9	ns	.03	.99	1.00	M1 vs. M5	26.59***	3
								M4 vs. M5	1.71	1
Cross-lagged relationships between cognitive antecedents and exhaustion										
M1	Stability model	30.86	12	.002	.09	.90	.96			
M2	Normal causation model	23.55	10	.009	.08	.92	.97	M1 vs. M2	7.31*	2
M3	Reversed causation model	26.04	10	.004	.09	.90	.96	M1 vs. M3	4.82	2
M4	Reciprocal causation model	18.62	8	.02	.08	.92	.98	M1 vs. M4	12.24*	4
								M2 vs. M4	4.93	2
								M3 vs. M4	7.42*	2
M5	Final model	25.66	11	.007	.08	.92	.97	M1 vs. M5	5.52*	1
								M2 vs. M5	2.11	1

Coefficients and numbers refer to model fit indices: M = model, χ^2 = chi-square, *df* = degrees of freedom, RMSEA = root mean square error of approximation, TLI = Tucker Lewis Index, CFI = Comparative Fit Index, $\Delta\chi^2$ = difference in chi-square, Δdf = difference in degrees of freedom.
*$p < .05$, **$p < .01$, ***$p < .001$.

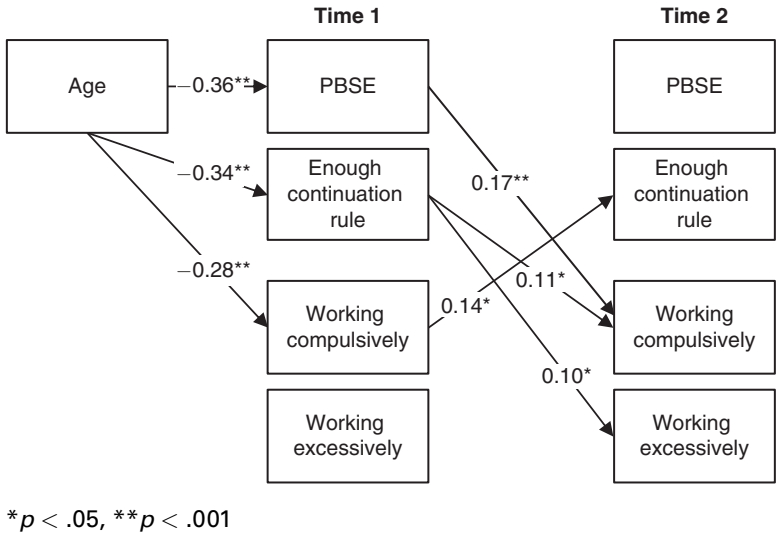

FIGURE 1. Final Direct Effects Model of Statistically Significant Cross-Lagged Associations Between Cognitive Antecedents and Workaholism

(M2 vs. M1). When comparing the reversed causation model to the stability model, it appeared that also the reversed causation model had a superior fit (M3 vs. M1). Yet, the chi-square difference test showed that the reciprocal causation model was significantly better than the stability model (M4 vs. M1), the normal causation model (M4 vs. M2), and the reversed causation model (M4 vs. M3). This is confirmed by the other fit indices. Looking at the path coefficients for Model 5, however, not all relationships were significant. Most importantly, the relationship between T1 working excessively and T2 exhaustion was not significant, indicating that exhaustion could not be predicted from working exceptionally hard six months before. In order to create a more parsimonious model, we dropped this nonsignificant path. Comparison between the parsimonious model and the reciprocal model revealed no significant differences (M5 vs. M4). Therefore, we retained the most parsimonious model (M5) as our final model.

Parameter estimates of this final model are shown in Figure 2. In addition to the high stabilities for working compulsively and working excessively (.68 and .73, respectively), a moderately high stability coefficient was found for exhaustion (.62). With regard to the covariates, age was significant related to working compulsively ($\beta = -0.28$, $p < .001$) and to exhaustion ($\beta = -0.18$, $p < .05$) at Time 1. This implies that the younger the employee, the more likely they will have a compulsive work drive or experience severe fatigue. Again, gender was not related to any of the other variables at Time 1.

Hypothesis 3 asserted that working compulsively and working excessively at Time 1 would have lagged positive effects on exhaustion at Time 2. It was shown earlier that T1 working excessively did not have a unique effect on T2 exhaustion. Nevertheless, in line with our expectations, T1 working compulsively was positively related to T2 exhaustion ($\beta = .23$, $p < .001$). Therefore, Hypothesis 3 was partly supported by the data. However, as the model with cross-lagged reciprocal relationships best fit the data, the reversed causal paths between workaholism and exhaustion seem equally important. The results indicated, indeed, additional cross-lagged effects from T1 exhaustion to T2 working compulsively ($\beta = .12$, $p < .05$) and to T2 working excessively ($\beta = .10$, $p < .05$). These findings

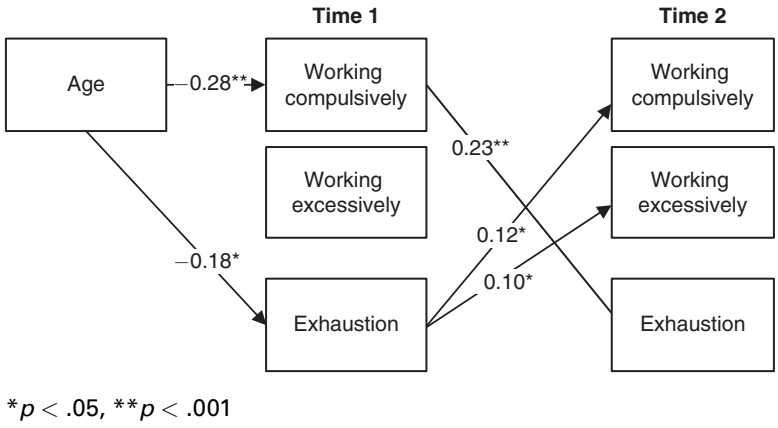

FIGURE 2. Final Direct Effects Model of Statistically Significant Cross-Lagged Associations Between Workaholism and Exhaustion

show that working compulsively and exhaustion reciprocally reinforce each other. Furthermore, although exhaustion is not predicted by working excessively, it seems to provoke working excessively itself.

Cognitive Antecedents and Exhaustion

In the final step, we examined the longitudinal associations between the hypothesized predictors and the outcome (Hypothesis 4 and Hypothesis 5, respectively). Table II shows that the models generally fit the data well, as the fit indices exceeded the critical levels. The only exception is the RMSEA value ($> .08$) for the stability model (M1) and the reversed causation model (M3). The chi-square difference test between the models indicated that the reciprocal model provided a significant better fit to the data than the stability model (M4 vs. M1) and the reversed causation model (M4 vs. M3) but has a comparable fit to the normal causation model (M4 vs. M2). The reciprocal causation model can only be justified when it has a better fit than all three other models and is more parsimonious than the alternatives (Farrell, 1994). As this was not the case, the reciprocal causation model was rejected in favor of the normal causation model. We estimated a final model by eliminating from the normal causation model the one causal path that was not statistically significant. Comparison of this final, more parsimonious model to the original normal causation model (M5 vs. M2) did not show significant difference in fit. Standardized parameter estimates for this final model are displayed in Figure 3.

We hypothesized that performance-based self-esteem and the enough continuation rule predict exhaustion over time (Hypothesis 4 and 5, respectively). Since performance-based self-esteem at T1 did not significantly influence exhaustion at T2, Hypothesis 4 was not supported. In addition, the T1 enough continuation rule was positively related to T2 exhaustion ($\beta = .13$, $p < .05$). In other words, Hypothesis 5 was confirmed by our data. Altogether, these results partly support the direct relationship between cognitive antecedents and exhaustion over time.

The enough continuation rule showed a direct lagged effect on exhaustion, which is a precondition for the role of workaholism as a partial mediator in the relationship with exhaustion. Nevertheless, as outlined earlier, of both workaholism components, working excessively was not related to exhaustion over time, and, hence, does not satisfy this necessary condition. Therefore, only working compulsively appears to partly mediate the relationship between the enough continuation rule and exhaustion. An estimation of the mediational effect is given by multiplying the standardized estimates of the path

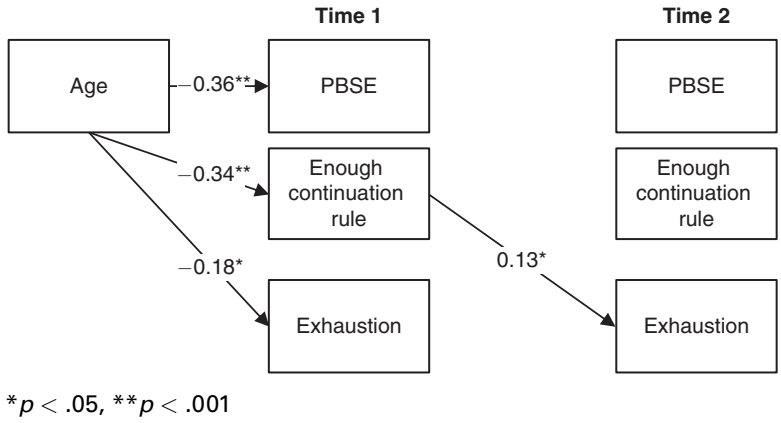

FIGURE 3. Final Direct Effects Model of Statistically Significant Cross-Lagged Associations Between Cognitive Antecedents and Exhaustion

linking the enough continuation rule and working compulsively ($\beta = .11$) with that of the path linking working compulsively and exhaustion ($\beta = .23$) (Cole & Maxwell, 2003), yielding an effect of .03. A one-tailed Sobel test indicated that this indirect effect is significant ($z = 1.79$, $p < .05$), hence supporting the existence of a mediation effect.

Discussion

The main purpose of the present study was to examine long-term relationships between cognitive antecedents (i.e., performance-based self-esteem and an enough continuation rule), workaholism, and exhaustion. Prevailing work suggests that workaholism might be preceded by maladaptive cognitions (McMillan et al., 2003), but research demonstrating this is nonetheless scarce. It was therefore hypothesized that cognitive antecedents, such as having a performance-based self-esteem, and using an enough continuation rule (continuing working in order to do enough), would be precursors of workaholism (Hypothesis 1 and Hypothesis 2, respectively), which, in turn, would lead to exhaustion over time (Hypothesis 3). In order to substantiate this mediation, we also hypothesized that these cognitive antecedents would be related to exhaustion over time (Hypotheses 4 and 5).

We found that striving for self-validation is indeed important in the workaholism process. It was found that having such a contingent self-esteem promotes a compulsive drive to work as measured with a six-month time lag. Performance-based self-esteem was, however, not related to the tendency to work excessively hard. In other words, performance-based self-esteem is related to the cognitive but not to the behavioral component of the workaholic phenomenon. The finding supports the notion that deriving self-esteem from external sources, such as performance at work, is a vulnerable basis for self-esteem (Crocker & Wolfe, 2001), as it may be predictive of a compulsive work drive, which is also labeled as the "tendency towards becoming a workaholic" (Taris et al., 2008, p. 162). It could also be argued that the observed effect is domain-specific: a cognitive evaluation of self (self-esteem) leads to a cognition that encourages hard work (compulsion). Moreover, these results underline the central role of the cognitive component, rather than the behavioral component, in workaholism (Schaufeli, Taris, & Bakker, 2006).

In addition, the results provided evidence for the assumption that relying on an enough continuation rule fosters workaholism in the long run. Application of an enough continuation rule was found to stimulate employees

to work compulsively and incessantly. So, apparently, using a cognitive rule influences not only the cognitive element of workaholism, but also the corresponding behavior. In addition, the current study shows that the enough continuation rule and a compulsive work drive are reciprocally related. In other words, a dynamic psychological process seems to exist in which the enough continuation rule and workaholism mutually reinforce each other. Continuing because not enough work is done stimulates employees to work compulsively and excessively, and at the same time, working compulsively drives employees to work until they feel that they have done enough. These findings confirm and elaborate the results of an earlier cross-sectional study that found that the enough continuation rule is associated with workaholism (Van Wijhe et al., 2011). The current study illustrates the reciprocal nature of this association.

Under fatigue, people tend to use automatic regulatory processes to guide actions or ideas, which are likely to result in rigid work behavior.

A possible explanation for the finding that performance-based self-esteem and the enough continuation rule are related to workaholism might be that usually workaholics are perfectionists; that is, they pursue high standards of performance (Flett & Hewitt, 2002). Several studies have found that perfectionism is associated with higher levels of workaholism (Burke, Davis, & Flett, 2008; Killinger, 2006; Spence & Robbins, 1992). In a recent study of Taris et al. (2010), the relationship of workaholism with two specific forms of perfectionism was examined (i.e., self-oriented perfectionism and socially prescribed perfectionism; Hewitt & Flett, 1991). Self-oriented perfectionism involves a person's belief that striving for perfection is important and is characterized by holding high standards for oneself. Socially prescribed perfectionism comprises the belief that perfectionist standards are held by others for oneself, and that approval by others is dependent upon meeting these standards. The results of the Taris et al. study showed that self-oriented perfectionism was unrelated to workaholism, whereas socially prescribed perfectionism was associated with high levels of workaholism. This may indicate that performance-based self-esteem and the use of an enough continuation rule both reflect the concern over not being perfect in the eyes of others (socially prescribed perfectionism).

The association between working compulsively and exhaustion corroborates prior cross-sectional research (Schaufeli et al., 2008; Taris et al., 2008). More specifically, the results clearly indicate a mutual influence between working compulsively and exhaustion. This reciprocal relationship possibly creates "loss cycles" in which one is strengthening the other, as suggested by the COR theory (Hobfoll, 2002). Such a vicious cycle would imply that working compulsively gives rise to feelings of exhaustion, which, in turn, will evoke a strong compulsive drive. To our knowledge, the lagged effect of exhaustion on working compulsively has not been demonstrated before. However, it has been put forward before that exhaustion causes a compulsive drive over time. For instance, experimental studies show that fatigue may lead to rigidity in performing task behavior (Van der Linden, Frese, & Meijman, 2003; Van der Linden, Frese, & Sonnentag, 2003). Rigid behavior is distinguished by reduced cognitive flexibility and an increased inclination to perseverate. Under fatigue, people tend to use automatic regulatory processes to guide actions or ideas, which are likely to result in rigid work behavior.

No significant lagged effect was observed of working excessively on exhaustion. Hence, the expected association between excess work behavior and severe fatigue (Hypothesis 3b) observed in the earlier studies (Van Der Hulst, 2003) was not replicated. Perhaps this may point to a sleeper effect, which is sometimes found in stressor–strain relations (Frese & Zapf, 1988), and has also been suggested to occur for burnout (Maslach, 1998). A sleeper effect implies that instead of immediately leading to strain (exhaustion), a particular stressor (working excessively) exhibits a delayed effect that manifests itself after some time has elapsed. It seems plausible that in order to detect the effect of working hard on strain, longer time lags than six months are

needed. On the whole, little is yet known about the optimal length of time lags in occupational health research (Dormann & Zapf, 2002; Taris & Kompier, 2003). Nevertheless, Dormann and Zapf (2002) showed in their study on the effect of social stressors on depressive symptoms that the strongest effects were found for a two-year interval, in comparison to a shorter or longer time lag. This could be an indication that a six-month time lag is too short an interval to demonstrate the expected effects. A related mechanism that could explain the lacking relationship between excess work and workaholism is the accumulation-threshold model (Garst, Frese, & Molenaar, 2000). According to this model, only after stressors exceed a certain threshold, long-term strain becomes visible. This could indicate that working excessively contributes to exhaustion over time, but this only becomes apparent when a certain threshold or "breaking point" has been reached. More elaborated longitudinal study designs will be needed to be able to demonstrate such a threshold.

Remarkably, a lagged positive effect of exhaustion on working excessively was found. An explanation for this unexpected finding is provided by the Effort-Recovery Theory (Meijman & Mulder, 1998). According to this theory, fatigued workers must invest additional compensatory effort to keep performing adequately at work. That is, in order to maintain adequate performance regardless of exhaustion, tired workers may work longer hours than nonexhausted workers. It might also imply that employees who are exhausted will be frequently absent, which will cause them to work even harder when present at work.

Altogether, we found support for the partial mediation effect leading from the enough continuation rule through working compulsively to exhaustion over a six-month study period. This seems to confirm the idea that workaholism partly (i.e., via working compulsively) carries the influence of cognitions (i.e., the enough continuation rule) to exhaustion. This is consistent with previous studies that have found positive associations between the enough continuation rule and workaholism (Van Wijhe et al., 2011) and between workaholism and burnout (Andreassen et al., 2007; Burke, 1999c; Taris et al., 2005, 2008). However, these studies used a cross-sectional design and did not examine mediation, including antecedents and consequences of workaholism. In line with COR theory (Hobfoll, 2002), our findings imply that when an employee tends to continue when feeling that not enough work has been done, this may foster a compulsive work drive, which further increases emotional exhaustion. Nevertheless, considering the reciprocal relationships between these variables, working compulsively may also be a partial mediator in the relationship from exhaustion to the enough continuation rule, again pointing to a possible "loss cycle."

Strengths and Limitations

With some exceptions (e.g., Burke, 1999b, 2001; Burke & Koksal, 2002; Mudrack, 2004; Ng et al., 2007; Spence & Robbins, 1992), relatively little research has focused on cognitive antecedents in studies of workaholism. The major strengths of the present study are its longitudinal nature and the testing of various competing longitudinal models that reflect different patterns of causality.

Nevertheless, the current study has also a number of weaknesses. First, although our sample includes multiple occupations, it is limited to one department of a university. In order to be able to generalize the findings to other types of jobs and employees, our results need to be replicated with other samples. In addition, the sample is not large, which constrains the possibilities of complex analysis of the data. Simultaneously analyzing the variables to enhance our understanding of the dynamics of relationships would have made the model too complex and could have resulted in unstable estimates (Kline, 2005). With a larger sample, more complex models could have been tested to arrive at more stable parameter estimates.

Second, our study is based on self-reports, which can be subject to problems of reliability. For instance, self-ratings may increase the risk of inflated relationships due to common method variance (Podsakoff, MacKenzie, Lee,

& Podsakoff, 2003). However, considering the nature of the variables, it seemed appropriate to obtain ratings from individuals' self-reports. Perceptions of cognitions, workaholism, and burnout are subjective by their very nature and should therefore be assessed by self-reports. In addition, Spector (2006) has argued that the impact of common method variance has been largely overrated. Nonetheless, to reduce the potential influence of common method variance, future research might add more objective measures of the dependent variables, such as observers' ratings of individuals' work behavior.

A final limitation concerns the scale that is used for the measurement of excessive working. Items of this scale refer to, for instance, continuing to work after coworkers have finished, which may not be applicable to the current sample. Academics often have highly autonomous jobs, which enables them to arrange their work in a flexible way, for instance, by working at home. Therefore, the academic staff in the current sample might not be able to compare their work hours to the working time of their colleagues. This may also account for the lacking effect of performance-based self-esteem on working excessively and of working excessively on exhaustion.

As a result of basing one's sense of self-worth and work persistence on one's performance, workaholics may have developed the habit of taking on more work than they can actually cope with. Therefore, time management training could be successfully used to reduce workaholism.

Implications and Suggestions for Future Research

The results of this study are of practical importance to HR managers and career counselors, as they give insight into the cognitive precursors of workaholism and its energy costs. This insight may help them to better support employees in handling work demands. Knowledge workers, such as academics, typically have open-ended jobs, making it more difficult for employees to quit working (Lewis, 2010). The current study shows that being vulnerable for beliefs such as "having to do as much as possible in order to feel worthwhile" evidently puts employees at risk for workaholism and exhaustion. This awareness can help professionals to effectively deal with the issue of work addiction and thereby stimulate a healthy commitment to a career among employees. More specifically, as a result of basing one's sense of self-worth and work persistence on one's performance, workaholics may have developed the habit of taking on more work than they can actually cope with. Therefore, time management training could be successfully used to reduce workaholism. Such programs help employees to set realistic goals and to delegate responsibility, so that they can better cope with their work stress. Our results further suggest that for employees who are prone to workaholism, interventions that focus on changing rigid cognitions might be effective. Chen (2006) already suggested using rational emotive behavior therapy (REBT) as developed by Ellis (1962) to replace maladaptive beliefs of workaholics for rational thinking. Ellis (1962) originally identified seven irrational beliefs. However, following research has distinguished four categories of irrational beliefs (Walen, DiGiuseppe, & Dryden, 1992): (1) demandingness, which refers to absolute ideas of how oneself or others should behave; (2) awfulizing/catastrophizing, which stands for the beliefs that a situation is awful, unbearable, and horrible; (3) low frustration tolerance, which represents the intolerance for discomfort, difficulties, and frustration; and (4) global evaluation, which includes overgeneralizations about the world, others, or the self. Performance-based self-esteem and the enough continuation rule both refer to a demand about oneself, which makes it likely that they fall under the first category. However, these two constructs may also be a reflection of low frustration tolerance at work. Future research should address this unresolved issue. Altogether, more insight in the role of irrational beliefs might be useful for organizing our knowledge of workaholism, but also offers a theoretical basis for intervention for workaholics.

Since the current study shows that a workaholic drive is associated with burnout (exhaustion) over time, and burnout

also appears to be a vulnerability factor for workaholism, it is crucial for organizations to monitor workaholism (Burke & MacDermid, 1999). It implies that HR professionals should stimulate employees to disengage and recuperate from a demanding workday, as it calls upon their energy resources (Sonnentag & Zijlstra, 2006). Without adequate recovery, continuous depletion of resources will result in strain reactions, such as exhaustion (Geurts & Sonnentag, 2006). Another important aspect of the present study is the finding that excessive work does not inevitably have unfavorable consequences for one's level of exhaustion; the association between working excessively and exhaustion was not significant. An interesting topic for future research would be to examine the relationship between workaholism and severe fatigue more closely, using multiple time waves in order to uncover the underlying process. In this respect, it would be interesting to look at the potential buffering role of recovery experiences (psychological detachment, relaxation, mastery experiences).

Conclusion

In sum, rigid personal beliefs, such as performance-based self-esteem and continuing to work until one feels that one has done enough, may be seen as vulnerability factors for workaholism. Furthermore, being obsessed with one's work leads to exhaustion, which, in its turn, seems to reinforce workaholic behavior. For maintaining a healthy work style, it seems therefore important to realize when enough is enough.

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